CLAIMS

What is claimed is:

1. A system for storing information in a data structure, the system comprising:

a distributor;

one or more storage elements for storing a plurality of sub-data structures; and

a receiver;

wherein the distributor distributes a plurality of items to be added to the data structure to the plurality of sub-data structures in an order; and the receiver receives the items from the plurality of sub-data structures in the order.

2. The system of claim 1, wherein each of the sub-data structures includes a linked-list data structure.

3. The system of claim 2, further comprising a storage for storing a head and a tail of the linked list data structure of each of the plurality of sub-data structures.

4. The system of claim 3, further comprising a memory for storing the elements in the data structure.

5. The system of claim 1, wherein the data structure is a linked-list data structure.

6. The system of claim 5, wherein each of the sub-data structures includes a linked-list data structure.

7. The system of claim 1, wherein the data structure is a queue.

8. The system of claim 7, wherein each of the sub-data structures includes a linked-list data structure.

9. A packet switching system including the system of claim 1.

10. A computer system including the system of claim 1.

11. A communications system including the system of claim 1.

12. A router including the system of claim 1.

13. A system for storing information in a plurality of data structures, the system comprising:

one or more storage elements for storing the plurality of data structures, each of the plurality of data structures including a plurality of sub-data structures;

a storage selector to select between the plurality of data structures for a particular piece of the information;

a distributor mechanism; and

a receiver mechanism;

wherein the distributor mechanism distributes each of a plurality of pieces of the information to be added to a particular one of the plurality of data structures to the plurality of sub-data structures belonging to the particular one of the plurality of data structures in an order; and the receiver receives the items from the plurality of sub-linked lists in the order.

14. The system of claim 13, wherein each of the sub-data structures includes a linked-list data structure.

15. The system of claim 14, further comprising a storage for storing a head and a tail of the linked list data structure of each of the plurality of sub-data structures.

16. The system of claim 15, further comprising a memory for storing the elements in the plurality of data structures.

17. The system of claim 13, wherein each of the plurality of data structures is a linked-list data structure.

18. The system of claim 17, wherein each of the sub-data structures includes a linked-list data structure.

19. The system of claim 13, wherein each of the plurality of data structures is a queue.

20. The system of claim 19, wherein each of the sub-data structures includes a linked-list data structure.

21. A system for storing information in a data structure, the data structure including a plurality of linked list data structures, the system comprising:

a head address storage for storing head information for each of the plurality of linked list data structures;

a head selector for selecting between said head information;

a tail address storage for storing tail information for each of the plurality of linked list data structures;

a tail selector for selecting between said tail list information; and

a memory for storing a plurality of elements of said information added to the data structure;

wherein the plurality of elements are added to the plurality linked list data structures in an order and the elements are removed from the plurality of linked list data structures in the order.

22. A system for storing information, the system comprising:

a plurality of data structures, each of the plurality of data structures including:

a plurality of linked list data structures;

a head address storage for storing head information for each of the plurality of linked list data structures;

a head selector for selecting between said head information;

a tail address storage for storing tail information for each of the plurality of linked list data structures; and

a tail selector for selecting between said tail list information;

wherein a plurality of elements of said information are added to the plurality linked list data structures in an order and the elements are removed from the plurality of linked list data structures in the order;

a memory for storing said information added to the plurality of data structures; and

a data structure selector mechanism for selecting between the plurality of data structures.

23. A method for adding a plurality of elements to a data structure, the data structure comprising a plurality of sub-data structures, the method comprising:

(a) receiving information to be added to the data structure;

(b) adding said received information to a currently selected one of the plurality of sub-data structures to which to add information;

(c) advancing the currently selected one of the plurality of sub-data structures to which to add information to a next one of the plurality of sub-data structures to which to add information in an order;

(d) removing information from a currently selected one of the plurality of sub-data structures to which to remove information;

(e) advancing the currently selected one of the plurality of sub-data structures to which to remove information to a next one of the plurality of sub-data structures to which to removed information in the order; and

repeatedly performing steps (a)-(c) to add information to the data structure and steps (d)-(e) to remove information from the data structure.

24. A method for adding a plurality of elements to a plurality of data structures, each of the plurality of data structures comprising a plurality of sub-data structures, the method comprising:

(a) receiving information to be added to the data structure;

(b) identifying one of the plurality of data structures to which to add the received information;

(c) adding said received information to a currently selected one of the plurality of sub-data structures to which to add information of the identified one of the plurality of data structures to which to add the received information;

(d) advancing the currently selected one of the plurality of sub-data structures to which to add information to a next one of the plurality of sub-data structures to which to add information in an order;

(e) identifying one of the plurality of data structures to which to remove a piece of stored information;

(f) removing information from a currently selected one of the plurality of sub-data structures to which to remove information of the identified one of the plurality of data structures to which to remove the piece of stored information;

(g) advancing the currently selected one of the plurality of sub-data structures to which to remove information to a next one of the plurality of sub-data structures to which to removed information in the order; and

repeatedly performing steps (a)-(d) to add information to the plurality of data structures and steps (e)-(g) to remove information from the plurality of data structures.

25. A system for storing information in a data structure, the data structure including a plurality of linked list data structures, the system comprising:

means for storing head information for each of the plurality of linked list data structures;

means for selecting between said head information;

means for storing tail information for each of the plurality of linked list data structures;

means for selecting between said tail list information; and

means for storing a plurality of elements of said information added to the data structure;

wherein the plurality of elements are added to the plurality linked list data structures in an order and the elements are removed from the plurality of linked list data structures in the order.

26. A system for storing information, the system comprising:

a plurality of data structures, each of the plurality of data structures including:

a plurality of linked list data structures;

means for storing head information for each of the plurality of linked list data structures;

means for selecting between said head information;

means for storing tail information for each of the plurality of linked list data structures; and

means for selecting between said tail list information;

wherein a plurality of elements of said information are added to the plurality linked list data structures in an order and the elements are removed from the plurality of linked list data structures in the order; and

means for storing said information added to the plurality of data structures; and

means for selecting between the plurality of data structures.

27. A system for adding a plurality of elements to a data structure, the data structure comprising a plurality of sub-data structures, the system comprising:

means for receiving information to be added to the data structure;

means for adding said received information to a currently selected one of the plurality of sub-data structures to which to add information;

means for advancing the currently selected one of the plurality of sub-data structures to which to add information to a next one of the plurality of sub-data structures to which to add information in an order;

means for removing information from a currently selected one of the plurality of sub-data structures to which to remove information; and

means for advancing the currently selected one of the plurality of sub-data structures to which to remove information to a next one of the plurality of sub-data structures to which to removed information in the order.

28. A method for adding a plurality of elements to a plurality of data structures, each of the plurality of data structures comprising a plurality of sub-data structures, the method comprising:

means for receiving information to be added to the data structure;

means for identifying one of the plurality of data structures to which to add the received information;

means for adding said received information to a currently selected one of the plurality of sub-data structures to which to add information of the identified one of the plurality of data structures to which to add the received information;

means for advancing the currently selected one of the plurality of sub-data structures to which to add information to a next one of the plurality of sub-data structures to which to add information in an order;

means for identifying one of the plurality of data structures to which to remove a piece of stored information;

means for removing information from a currently selected one of the plurality of sub-data structures to which to remove information of the identified one of the plurality of data structures to which to remove the piece of stored information; and

means for advancing the currently selected one of the plurality of sub-data structures to which to remove information to a next one of the plurality of sub-data structures to which to removed information in the order.